

3.14 Surface Waters and Wetlands

Surface waters on Tinian include lakes, ponds, and nearshore waters. Wetlands are defined “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.” (33 C.F.R. Part 328.3). Figure 3.14-1 shows the five surface water features and wetlands on Tinian, four of which are in the Military Lease Area. Section 3.10 Public Health and Safety includes an analysis of flood zones. The flood zones are areas of the landscape that may be flooded following heavy rain events but are not considered surface waters or wetlands.

3.14.1 Surface Waters

Surface waters are uncommon on Tinian and no permanent streams exist on the island because the porous limestone rock plateaus allow high amounts of rainfall to percolate from the surface to subsurface soils and groundwater. Surface waters typically occur in small (less than 3 acres) natural landscape depressions and craters in areas of impermeable clay that prevent infiltration of surface water or at perched water tables (temporary pockets of groundwater located above unsaturated soil or rock, not connected to the permanent groundwater table). The exception is Lake Hagoi (37 acres), which is a complex of intermittent surface water and wetlands and contains the largest area of surface water and wetlands in the Military Lease Area. The wetlands and surface waters on Tinian are all isolated, meaning they do not have a surface water connection to other wetlands or surface waters. As such, Tinian’s surface waters are entirely dependent on rainfall as a water source for sustaining productivity and habitat quality. On average, Tinian receives about 70 to 80 inches of rainfall per year with a distinct wet season from July through October consisting of high rainfall driven by tropical storms and typhoons. Tinian’s dry season from January through April has little rainfall, with transition periods in between wet and dry seasons (JRM 2020).

3.14.2 Wetlands

Like surface water, wetlands on Tinian are uncommon due to the high permeability of soils and underlying rock. Wetlands in the Military Lease Area include Lake Hagoi, Mahalang, and Bateha. A full U.S. Army Corps of Engineers jurisdictional determination of wetlands has not been conducted on Tinian, and the status of wetlands are undetermined at this time. Typically, a request for a jurisdictional determination would not be made unless wetlands were proposed to be impacted and a permit application were being submitted to place fill in a wetland.

- **Lake Hagoi.** A 37-acre wetland located within the northwest portion of the Military Lease Area. It is unclear if Lake Hagoi is hydraulically connected to groundwater (Gingerich 2002) and appears to be dependent on rainfall as a water source, as the water level drops in periods of drought (DON 2010). Since 2010, a steady reduction of open surface water has been observed at Lake Hagoi (DON 2015), and, with sediment inflow and the expansion of shore club-rush (*Shoenoplectus subulatus*), the open water area has been slowly decreasing in extent.

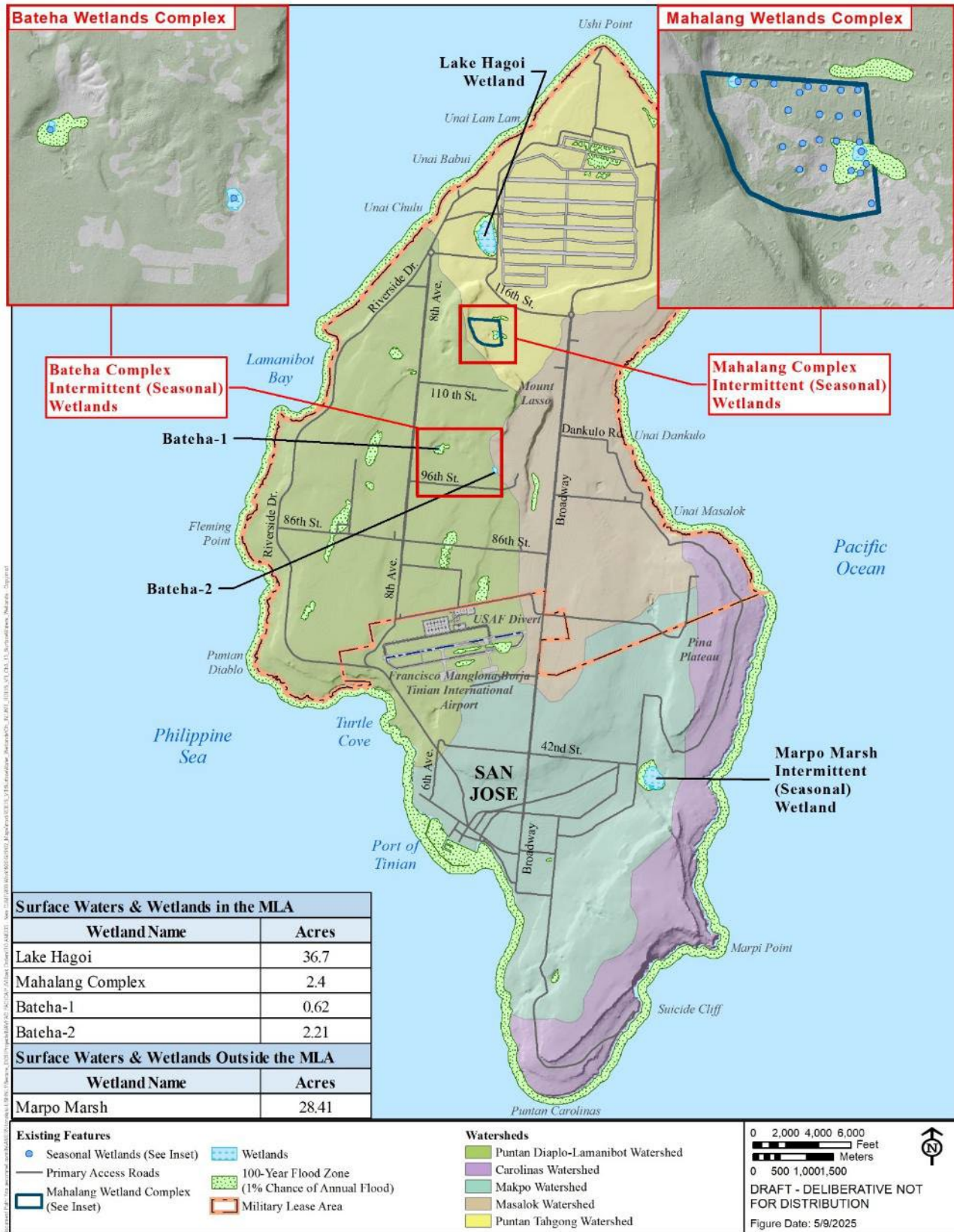


Figure 3.14-1 Tinian Surface Water and Wetland Features, Flood Zones, and Watersheds

- **Mahalang.** Located within the north central portion of the Military Lease Area, Mahalang wetland consists of 24 individual craters and depressions totaling approximately 2.4 acres, a subset of which retain water during the wet season. The two largest features combined are 0.9 acres. The complex is located on a plateau in an area of grasslands, tangan-tangan, and mixed secondary forest. Dominant vegetation within the craters consists of upland plant species, including introduced grass mixed with various weedy vines and herbaceous plants. Based on the 2014 wetland surveys of six ephemeral wetlands at the Mahalang Complex, one of the depressions (MD3) contained wetland vegetation, suitable hydrology, and hydric soils but had no connection and was not adjacent to navigable waters of the U.S. or tributaries to navigable waters of the U.S. Although four of the sites surveyed at Mahalang (MC1, MC2, M7, and M10) did have hydric soils and suitable hydrology, they did not support wetland vegetation and are considered ephemeral surface waters and not wetlands. Site M11 had suitable hydrology but lacked hydrophytic vegetation and hydric soils and is therefore not considered a wetland (DON 2015).
- **Bateha.** The Bateha site consists of two shallow depressions or “moats” of approximately 0.6 and 2.2 acres that contain water during wet periods (U.S. Fish and Wildlife Service 1996; NAVFAC Pacific 2013). They have evolved as eroded clay- and silt-filled depressions in limestone bedrock (DON 1997). Vegetation within and surrounding these features is dominated by introduced species. The 2014 wetland survey of the two Bateha sites documented suitable hydrology, hydrophytic vegetation, hydric soils, and lack of connection to surface drainage features or waters of the U.S. Both Bateha sites may be considered isolated wetlands (DON 2015).

3.14.3 Water Quality

CNMI water quality standards establish criteria designed to protect the designated uses for each classification of surface waters (i.e., coastal waters, fresh waters, and wetlands). Designated uses of fresh surface waters include aquatic life, fish consumption, recreation, aesthetic enjoyment, and potable water supply. The CNMI Bureau of Environmental and Coastal Quality maintains a monitoring program for water quality, which on Tinian is limited to coastal waters. Inland surface water quality has not yet been assessed, but the Division of Coastal Resources Management intends to establish a collaborative Bureau of Environmental and Coastal Quality Wetlands Program, which would involve an assessment of Tinian’s wetlands using the 2016 CNMI Wetland Rapid Assessment Method (Arriola et al., 2016).

Beginning in 2004, the quality of CNMI coastal waters has been assessed every 2 years (CNMI Bureau of Environmental and Coastal Quality 2022). As presented in Appendix I of CNMI Bureau of Environmental and Coastal Quality 2022 *Water Quality Assessment Report*, the coastal waters of the Masalok, Makpo, Makpo Harbor, Puntan Diaplo-Lamanibot, and Puntan Tahgong sub-watersheds, were listed as impaired by one or more pollutants during the reporting cycles from 2004 to 2022 (Table 3.14-1).

Table 3.14-1 Impaired Coastal Waters on Tinian

| <i>Sub-watershed</i> | <i>Pollutant(s)</i> | <i>Source</i> | <i>Years Listed</i> |
|-------------------------|---|--|--|
| Masalok | Enterococci, Nitrate, Orthophosphate | Unknown | 2022 2020 2018 2016 2014 2004 |
| Makpo | Biocriteria, Dissolved oxygen, Enterococci, Low pH, Orthophosphate, Nitrate | Unknown, on-site treatment systems, urban runoff | 2022 2020 2018 2016 2014 2012 2010 2006 2004 |
| Makpo Harbor | Enterococci, Dissolved oxygen, Orthophosphate | Unknown | 2022 2020 2018 2016 |
| Puntan Diaplo-Lamanibot | Dissolved oxygen, Enterococci, Nitrate, Orthophosphate | Unknown | 2022 2020 2018 2016 2014 2012 2004 |
| Puntan Tahgong | Biocriteria, Dissolved oxygen, Enterococci, Nitrate, Orthophosphate | Unknown | 2022 2020 2018 2016 2014 2006 2004 |

Sources: Yuknavage et al. 2022; Appendix VI: CNMI Coastal Water Bodies Reported by Assigned CALM Categories; Table VI-b Category 2: 2022 Coastal Waters Attaining Some Designated Uses, Insufficient Information about Remaining Designated Uses.

The Makpo sub-watershed has the greatest number of pollutants and includes both Tinian’s commercial harbor and its population center (San Jose). Existing concerns and sources of pollution for the Makpo sub-watershed include the absence of centralized wastewater collection and treatment systems, cesspools and septic systems, marina boat maintenance, animal holding management areas, livestock grazing in riparian/shoreline areas, waste from pets, illegal dumps and disposals, and undefined sources (Yuknavage et al. 2022).